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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,466	11/21/2001	Coming Chen	UMC-98-048 CON	3828

7590 04/08/2003  
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EXAMINER

BARRECA, NICOLE M

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 04/08/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/991,466	<b>Applicant(s)</b> CHEN ET AL.	
	<b>Examiner</b> Nicole M. Barreca	<b>Art Unit</b> 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 November 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/075,618.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>6</u> . | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. Claims 4-8 are pending in this application. ✓
2. The claims as currently written in the present application are supported by the original disclosure of 09/075,618 and therefore have the effective filing date of 5/11/98.

### *Drawings*

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: "24" in figure 1D and "48c" in figure 2E. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 4-6, 8 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Jang (US 6,004,863).
6. Jang discloses a planarizing method for use shallow trench isolation (STI) and recessed oxide isolation (ROI). Pad oxide layer 32 and silicon nitride layer 34 are

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formed on semiconductor substrate 30 (col.12, 53-62). The substrate is etched to form narrow mesas 31a, 31b, 31c (small active regions) separated by narrow isolation trenches 33a and 33b and wide mesas 31d (large active region) separated by wide isolation trench 33c (col.13, 54-67). Blanket trench fill dielectric layer 36 is formed of silicon oxide dielectric material using a high density plasma chemical vapor deposition HDP-CVD (col.14, 31-37). Patterned photoresist layers 38a and 38b are used as an etch mask to remove the center part of the oxide over the large active region down to the silicon nitride, while leaving oxide remaining on the edges of the large active region and on the small active regions. The photoresist is then removed (fig.10, 11). The remaining oxides 36a'-36e' are planarized to the height of the mesas using a buffered oxide etch (col.15, 15-col.16, 24).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weigand (US 5,851,899).

9. Weigand discloses a method for filling shallow trench isolation trenches.

Structure 30 is formed on substrate 40. Large active region 50 and small active region 51 are formed along with shallow trenches 44 and 46 (col.4, 37-54). Oxide layer 52 is formed over the surface of the substrate filling the trenches using HDP-CVD (col.5, 8-

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63). Photoresist 60 is used as an inverse mask to remove portions of the oxide layer 52. Figure 4B illustrates that portions of the oxide overlying the center portion of the large active region 50 are removed, while wedges 62 remain on the edges of large active region 50 and on small active region 51 (col.7, 1-59). The structure is exposed to a CMP step, which removes the remaining oxide and leaves a planarized structure (col.8, 1-8). Weigand does not disclose forming a silicon nitride layer on the substrate and using the silicon nitride as a stop layer when the oxide layer is removed. Weigand however does teach that the substrate may itself comprises layers of structure stacked one upon the other but for purposes of discussion are not illustrated and are generally referred to herein as a substrate (col.4, 37-54). Weigand also teaches that a silicon nitride layer is conventionally present on the surface of the substrate (but not shown) and used as an etch stop for the oxide layer (col.2, 44-48). It would have been obvious to one of ordinary skill in the art to form a silicon nitride layer on the substrate and to use the silicon nitride as a stop layer when the oxide layer is removed in the method of Weigand because Weigand teaches that the substrate may itself comprises layers of structure stacked one upon the other but for purposes of discussion are not illustrated and are generally referred to herein as a substrate and that conventionally a silicon nitride layer is formed on the surface of the substrate for use as an etch stop.

10. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jang as applied to claims 4 or 8 above, and further in view of Chen (US 5,969,425).

11. Jang planarized the HDP oxide layer by etching and does not disclose planarizing the oxide layer using chemical mechanical polishing (CMP). Chen teaches

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that a dielectric layer such as a HDP oxide is conventionally planarized using etching or CMP (col.1, 35-42). It would have been obvious to one of ordinary skill in the art to planarized the HDP oxide layer using CMP, instead of etching, in the method of Jang because Chen teaches that etching and CMP are both conventional methods used in the art to planarized a HDP oxide layer.

### ***Double Patenting***

12. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

13. Claims 4-10 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-7 of prior U.S. Patent No. 5,958,795. This is a double patenting rejection.

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 4-10 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-6 of U.S. Patent No. 6,169,012.

16. Claims 4, 6 and 8 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 6 of U.S. Patent No. 6,486,040.

17. Although the conflicting claims are not identical because their scopes are different, they are not patentably distinct from each other. All of the limitations in the claims of the present application are also claimed in 6,169,012 and 6,486,040. The only difference between the claims of the present application and the patented claims is that 6,169,012 and 6,486,040 both include an additional limitation that the center opening of the reverse active mask has a dummy pattern comprising of at least one protrusion. The claims of the present application are therefore broader in scope and are anticipated by the claims of 6,169,012 and 6,486,040. See *In re Goodman*.

### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yang (US 6,057,210) discloses a STI method wherein the oxide is removed completely from the large and small active regions. Chen (US 6,448,159 and US 6,291,111) disclose methods for trench polishing. Chen (US 2002/001919)

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discloses a method for forming a partial reverse active mask. Chen (US 2002/0094493) is the Patent Application Publication for the present application.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole M. Barreca whose telephone number is 703-308-7968. The examiner can normally be reached on Monday-Thursday (8:00 am-6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Nicole Barreca  
Patent Examiner  
Art Unit 1756



April 4, 2003